1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY.

1.1. **Product name: OXYGEN**

1.2. **Chemical formula: O_2**

REACH Registration number: Not required

Oxygen is included in Annex IV/V of REACH, exempt from registration.

1.3. **Uses:** Welding and cutting; air enrichment in the production of glass, cement, dolomites, lime, refractory materials; oxygen burners for glass melting; chemical industry; air enrichment in blast furnaces, cupolas and rotary kilns; in medicine etc.

1.4. **Details of the supplier:**

"SOL Bulgaria" EAD
Sofia
Vladaiska reka Str. 12
Tel: (02) 9366449, Fax: (02)9367859

1.5. **Emergency telephone number**

(02) 9366449

2. HAZARDS IDENTIFICATION.

Classification of the substance:

Classification according to Directive EC 67/548: O; R8.

Identification of hazards according to Regulation EC 1272/2008 (CLP):

Classification according to Regulation CE 1272/2008 CLP: Oxidising gas 1; compressed gas

- **Physical hazards**:

Gas under pressure, compressed gas - Attention (H280)
Oxidising gas - Category 1 - Hazardous (H270)

Labeling:

- **Pictogram:**

Signal word: DANGER!

Hazard statements:

H270: May cause or intensify fire; oxidiser
H280: Contains gas under pressure; may explode when heated.

Safety recommendations: P220: Keep/store away from clothing, combustible materials.

- **Protection:** P244: Clean the control valves of grease and oil.
- **Action:** P370+P376: In case of fire: Stop leak if it is safe
- **Storage**: P410+P403: Keep away from direct sunlight. To be stored in a well ventilated area.

HAZARDS: High pressure oxydising gas. Supports combustion.

It is recommended a self-contained (individual) breathing apparatus for personnel rescue.

INHALATION: By inhalation of more than 80 % oxygen at atmospheric pressure for more than few hours may cause suffocation, coughing, red throat, chest pains, breathing difficulty. Inhaling pure oxygen under pressure may cause damage to the lung, to the central nervous system.

SKIN CONTACT: Not hazardous.

SWALLOWING: This product is a gas at normal temperature and pressure.

EYE CONTACT: No data on adverse effects.
Not hazardous for the environment.

3. COMPOSITION OF THE SUBSTANCE:

3.1. General characteristics of chemical substances and their percentage.

Indexes	Limit values	CAS No.:	EINCS No.:	Index No
Oxygen content,%	**99.5**	**7782-44-7**	**231-956-9**	**008-001-00-8**
Nitrogen content,%	**0.5**	**7727-37-9**	**231-783-9**	

3.2. Classification according to Regulation on classification, labeling and packaging of substances and mixtures.

Classification:	Labeling
O; R8	**O** **R:8** **S:(2-)17**

See Section 16 for full text of *R- and S*-phrases

4. FIRST AID MEASURES.

INHALATION:
When a person has breathed pure oxygen at atmospheric pressure within 5 hours or 3 hours at a pressure of 3 atm., or 30 minutes at 4 atm., or 5 minutes at 7 atm., appear signs and symptoms of poisoning - nausea, dizziness, lungs inflammation, decreasing of body temperature, difficult breathing, slow pulse rate, lung damage, contraction of peripheral blood vessels, breach or loss of vision, epileptic seizures or death. It is possible to breathe pure oxygen at a pressure of 1/3 atm. within few weeks without any damage.
Inhaling pure oxygen up to 16 hours per day under atmospheric pressure for a long period causes difficult detectable damage to humans.
After a long stay in an oxygen-enriched environment seek for qualified medical assistance.
SKIN CONTACT: Skin injuries are not expected.
SWALLOWING: This product is a gas at normal pressure and temperature.
EYE CONTACT: Skin injuries are not expected.

5. FIRE-FIGHTING MEASURES.

5.1. Extinguishing media.
Non-flammable gas. Supports combustion.
Use the available fire extinguishing media.
Notify Fire Safety and Civil Protection Department.
5.2. Products of combustion.
No
5.3. Specific hazards.
Evacuate from the area all personnel not involved in fire extinguishing.
LIMITS OF FLAMMABILITY IN AIR, %: Not applicable.
5.4. Special protective equipment for firefighters.
Special resistance to high temperature clothing, gloves, boots, breathing apparatus (Saturn, Draeger).

6. ACCIDENTAL RELEASE MEASURES.

6.1. Personal precautions:
Use personal protective equipment, e.g. special working clothing, gloves, safety glasses or face shield.
Do not allow contact of oxygen with oil and grease - it may cause an explosion.
In the event of oxygen leakage immediately evacuate all personnel from the hazard area.
Stop oxygen leaking.
Provide ventilation of the room.
6.2. Environmental precautions.
Try to stop leakage. Protect entry into sewer systems, basements, production premises or other places, where accumulation can be dangerous.

7. HANDLING AND STORAGE.

7.1. Handling.
Use personal protective equipment, e.g. special working clothing, gloves, safety glasses or face shield. Keep cylinders off damage. Use a suitable hand truck or fork lifts to move cylinders. Do not drag, roll, slide or hit the cylinders. Never lift cylinders without the safety caps. Cap is intended solely to protect the valve. Never place objects inside the cap (e.g. wrench, screwdriver etc.). This can cause damage to the valve and lead to gas leakage.
Open valve slowly to avoid the pressure impact. If the valve opens hardly stop operation and contact your supplier.
Do not use oil or grease.
7.2. Storage.
Store separately from flammable gases and materials, or use baffle of non-combustible material, 6 m distance at least. This baffle has to be at least 1.5 m high and to be resistant to fire for half an hour at least. Prevent falling and hitting the cylinders.
In the areas of storage and use must be placed signs with following inscription:
"Fire naked flame and smoking prohibited**".** The full and empty containers shall be stored separately.
All electrical equipment in the storage room has to be secured. Storage facilities must meet the established rules for
Class 1 - Hazard area. Store at temperature not higher than 50 ^{o}C.
The storage room shall be dry and well ventilated or with natural ventilation.
Keep cylinders away from direct sunlight (sunshine). Heating of the cylinder increases the gas pressure and may cause an explosion.
OTHER HAZARDS DURING HANDLING, STORAGE AND USE:
High pressure oxydising gas. Supports combustion. Store oil, grease, and flammable materials away from the oxygen cylinders. Store and use in well-ventilated place all the time.
Close valve after each use; keep valve closed even if the cylinder is empty. When returning cylinders to the supplier, make sure that the valves are closed. In case of leakage close the cylinder valve.
8. EXPOSURE CONTROL AND PERSONAL PROTECTION EQUIPMENT.
8.1. Exposure limits.
There is no data for limit concentrations in the classification of oxygen.
8.2. Exposure control.
To be stored away from sources of fire, heat, flammable materials and substances, and from direct solar heat.
Provide reliable ventilation in the storage premises.
No smoking!
8.2.1. Exposure control at working environment.
To provide natural and/or forced ventilation in order to prevent supersaturation (enrichment) with oxygen by inhalation and accumulation in the clothing.
Provide personal protective equipment, e.g. special working clothing, gloves, safety glasses.
Respiratory protection.
To provide natural and/or forced ventilation in order to prevent oversaturation with oxygen by breathing.
Hand protection.
It is recommended to wear gloves during operation.
Eye protection.
It is recommended to wear safety glasses during operation.
Skin and body protection.
Use antistatic leather boots with metal plate and toe-cap. Wear protection clothing where needed.
8.2.2. Environmental exposure control.
Do not discharge in enclosed spaces, especially at lower ground levels.
9. PHYSICAL AND CHEMICAL PROPERTIES.

Chemical type:	Non-metal
Group, sequence number, period, unit:	6 (6A),8, 2, p
Appearance:	Colorless gas
Odour:	N/A
Contained in the air:	% vol. 21

Atomic properties

Atomic mass:	15,9994 u
Molecular mass:	15.99
Oxidative conditions:	(Oxide): -2,-1 (neutral)
Crystalline structure:	Cubic

Physical properties

Density:	1,42934 kg/mi
Melting point:	50,35 K (-218,4 ° C)
Boiling point:	90,18 K (-182,9 °C)
Molar volume:	17,36 10^{-6} m^3/mol
Specific melting heat:	0,22259 kJ/mol
Specific vaporization heat:	3,4099 kJ/mol

Other

Specific heat capacity:	920 J/kg K
Thermal conductivity:	0,02674 W/(m K)

Chemical properties

Solubility in water /at 20°C and 1 bar/ - 39 mg/l

Almost all reactions of oxygen with other chemical compounds are reactions of exothermic oxidation, i.e. with heat release.

With the exception of the noble gases oxygen connects directly to all the elements to form oxides. Its reactivity to different elements varies widely. Some elements like alkaline and alkaline earth metals for example, ignite spontaneously, but most of the elements do not oxidate so violently at normal temperatures. For example, oxygen does not react with hydrogen at normal temperature, but at 550 °C an explosive reaction occurs:

$2H_2 + O_2 = 2H_2O$.

Carbon must be heated to ignite and precious metals oxidate at very high temperatures only. By combustion of hydrocarbons like oil, coal and natural gas is generated heat and electrical power. When these materials are burned in excess of air, at temperatures below1131°C they form carbon dioxide, water, nitrogen and unreacted oxygen. At temperatures above 1649°C, and by lack of oxygen are formed hydrogen and carbon monoxide. At low temperatures the oxygen reacts with organic compounds and as a result from benzol is formed phenol, from naphthalene phthalic anhydride, etc. as well as various alcohols, aldehydes, acids and ketones of alkanes. Small quantities ozone may be obtained from oxygen in conditions of electrical discharge.

Ignition of materials in the presence of oxygen occurs in the presence of sources which energy is tens of times less than the energy necessary for ignition of materials in the presence of air. Sources of ignition of fire are: open fire, smoke, electric power lines, static electricity, friction, gas shocks by quick valve opening.

The combustion velocity of the substances in the presence of oxygen is 10-100 times higher than in the air.

Especially high is the speed of combustion of organic substances.

10. STABILITY AND REACTIVITY

10.1. Stability.

The product is stable by observation the storage conditions.

10.2. Conditions to be avoided.

Immediate proximity to sources of heat and fire.

10.3. Materials to be avoided. Oils, grease, fats, and combustible materials.

10.4. Hazardous products of degradation.

No

11. TOXICOLOGICAL INFORMATION

No toxicological effects of this product are known.

12. ECOCLOGICAL INFORMATION.

12.1. Ecotoxicity.

Oxygen is not toxic and does not contaminate soil and water.

12.2. Mobility.

See p. 12.1.

12.3. Bioaccumulation.

The product does not display any bioaccumulative properties.

13. DISPOSAL CONSIDERATIONS

Do not attempt to release residual or unused quantity. Return the cylinder to the supplier.

14. TRANSPORT INFORMATION.

- **UN №: 1072**
- **Labeling ADR:**

2.2: Non-flammable, non-toxic gas **5.1. Substances supporting combustion (oxidising)**

- ADR/RID H.I. nr: 25

- **Transport identification: OXYGEN, COMPRESSED**
- **ADR class**: 2
- **ADR/RID Classification code: 1 O**
- Packing **instructions: P200**
- **Other transport information:** Avoid transporting with vehicle, where the load is not separated from the driver's seat.

Before transportation of the product:

- Make sure that the containers are secured.
- Make sure that the valves of the cylinders are closed and do not leak.
- Make sure that the valve protection mechanism is trouble free.
- Make sure that there is a good ventilation.
- Comply with the applicable rules.

15. REGULATORY INFORMATION.

The Safety data sheet is prepared in compliance with the requirements of the REACH Regulation, Regulation EC 1272/2008 (CLP), standards and legislation in the field of health, safety and ecology.

16. OTHER INFORMATION.

Label

Standard texts warning of the risk associated with the use of the hazardous chemical (R-phrases).

R 8 - Fire hazards by contact with combustible materials.

Standard texts giving advices for safe storage and use of the hazardous chemical **(S-phrases).**

S (2-)17 - keep away from combustible materials.

Symbol: O - oxidising

"SOL Bulgaria" EAD is asking every oxygen user to become familiar with the Safety data sheet and to be aware of the hazards of this product and of the safety information.

This document is only intended for indication of correct and safe operation of the product by employees and customers with appropriate training. Persons receiving this information should make an independent estimation to determine the suitability for this specific purpose.